



Lower Boise River General Investigation Interim Feasibility Study

U.S. ARMY CORPS OF ENGINEERS

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BACKGROUND: The U.S. Army Corps of Engineers (Corps) and Idaho Water Resource Board (IWRB) are partnering on an interim feasibility study of the lower Boise River and tributaries from Lucky Peak Dam downstream to the confluence with the Snake River. Significant development in the river corridor and population growth has sparked interest in flood risk management and water supply issues. Interest has also been expressed in environmental restoration, to include habitat preservation, aesthetics and recreation along the Boise River.

The interim feasibility study is focusing on water storage as one potential measure for addressing water supply demand and flood risk reduction planning objectives. The study is currently evaluating surface water storage sites upstream of Lucky Peak Dam and updating flood risk information. A later, second phase of the feasibility study will conduct a more comprehensive analysis of the watershed to examine additional strategies to address flood risk, water supply and ecosystem restoration purposes.

Additional information about the study, including reports and analyses, can be found on the Corps' study website located at www.nww.usace.army.mil/boise/brifs/default.asp, or by contacting Project Manager Ellen Berggren at 208-345-2065 or Boise.Office@usace.army.mil.

STUDY AUTHORITIES: The Corps' study authorization is provided by Section 414, Water Resources Development Act (WRDA) of 1999, authorizing a feasibility study for flood control on the Boise River; and Section 4038, WRDA 2007, modifying the 1999 authority to include ecosystem restoration and water supply as project purposes.

IWRB study authorization is provided by bills and memorials passed by the 2008 Idaho Legislature, including House Bills 428 and 644 which established the Statewide Comprehensive Aquifer Planning and Management Program (Section 42-1779, *Idaho Code*) and created the Aquifer Planning and Management Fund. The program provides for technical studies needed to evaluate ground and surface water resource management alternatives. House Joint Memorial 8, also passed in 2008, directed IWRB to initiate and complete the study of additional water storage projects in the state in coordination with other public and private entities.

STUDY OVERVIEW: The Corps developed a two-phased feasibility study approach to assist with the Treasure Valley Comprehensive Aquifer Management Plan (CAMP), a concurrent but separate planning effort initiated by the IWRB to address future water supply and demand issues in the lower Boise River basin over the next 50 years. The Treasure Valley CAMP process includes a series of technical studies, including a surface water storage assessment conducted during the Interim Feasibility Study, to characterize surface and ground water resources. The IWRB will consider surface water storage as well as many other strategies to meet future water demand.

In May 2009, the Corps and IWRB entered into an agreement to initiate the first, or interim phase, of the two-phased feasibility study. The interim feasibility phase will 1) evaluate and document existing conditions on the Boise River, 2) evaluate and update information about flood risk, 3) analyze surface water storage opportunities in the basin, and 4) develop a path forward to complete the feasibility study.

In June and July 2010, the Corps and IWRB conducted public information meetings to request feedback on the water resources problems and alternatives that the study should address and presented preliminary analyses. The *Public Information Meetings and Public Comment Summary* (September 2010) document summarizes the feedback received.

From October 2009 through August 2010, the study team conducted a surface water storage screening analysis. The analysis used information contained in the Bureau of Reclamation's (Reclamation) 2006 *Boise/Payette Water Storage Assessment Report*. The Corps screening evaluation scored sites for six criteria, including future water demand, flood risk reduction, hydropower potential, a relative cost index, and social and environmental effects. The three top-ranked water storage and flood risk reduction sites included (1) replacement of Arrowrock Dam, (2) construction of a new dam at the Alexander Flats site, and (3) construction of a new dam at the Twin Springs site. The 2010 *Water Storage Screening Analysis* document describes the screening criteria, the process used to score the surface water storage sites and the analysis results. The document can be downloaded from the study website.

CURRENT STATUS: In June 2011, the Corps received some funds to continue the Lower Boise River Interim Feasibility Study. The IWRB directed the Corps to conduct a preliminary analysis of the Arrowrock site. The purpose of the analysis was to

- Identify the most appropriate surface water storage concept for the Arrowrock site (i.e., raise the existing structure or construct a new facility downstream),
- Determine whether there were major engineering or geological constraints that would make a dam raise or a new downstream dam technically unfeasible or cost prohibitive, and
- Identify any significant issues that should be considered for future analyses.

The analysis relied on available data, including a review of historical documents related to the planning and construction of Arrowrock Dam, and geological records and maps. A field reconnaissance was conducted from Arrowrock Dam downstream. The Corps coordinated with Reclamation engineers and geologists. (Arrowrock Dam was constructed by and is operated by Reclamation.)

The dam raise concept assumed that Arrowrock Dam would be raised about 74 feet and provide about 300,000 acre-feet of additional storage. Two locations immediately downstream of Arrowrock Dam were identified for a potential new dam (Option 1 and 2, see figures 1 and 2). This concept assumed a 368-foot dam would be constructed at the upstream end of the Lucky Peak reservoir pool. The analysis recommended Option 1 over Option 2 because geologic conditions are more favorable and a dam would be less expensive to construct at the Option 1 location.

The preliminary analysis concluded that based on existing information and resources available during the analysis, raising Arrowrock Dam or building a new dam downstream are both technically feasible. Existing information did not identify geologic or engineering constraints that could discount either concept in favor of the other. The analysis identified a number of uncertainties and unknowns that add cost risks to planning, data collection and construction for either concept. This is typical at this planning stage. Many of these uncertainties would be addressed during future study and data collection efforts.

The report further recommends that if only one concept were pursued, the study should continue to examine raising Arrowrock Dam because there could be significant construction cost savings from the reduced quantity of material required compared to a new downstream dam. Further, study exploration is anticipated to be potentially more costly and logistically challenging at a downstream site located in the Lucky Peak reservoir pool than at the existing Arrowrock Dam site.



Boise River looking towards north shore, with Arrowrock Dam located on the right. Options 1 and 2 were identified as potential locations for a new dam. The Boise River flows from the right to left in the photograph.

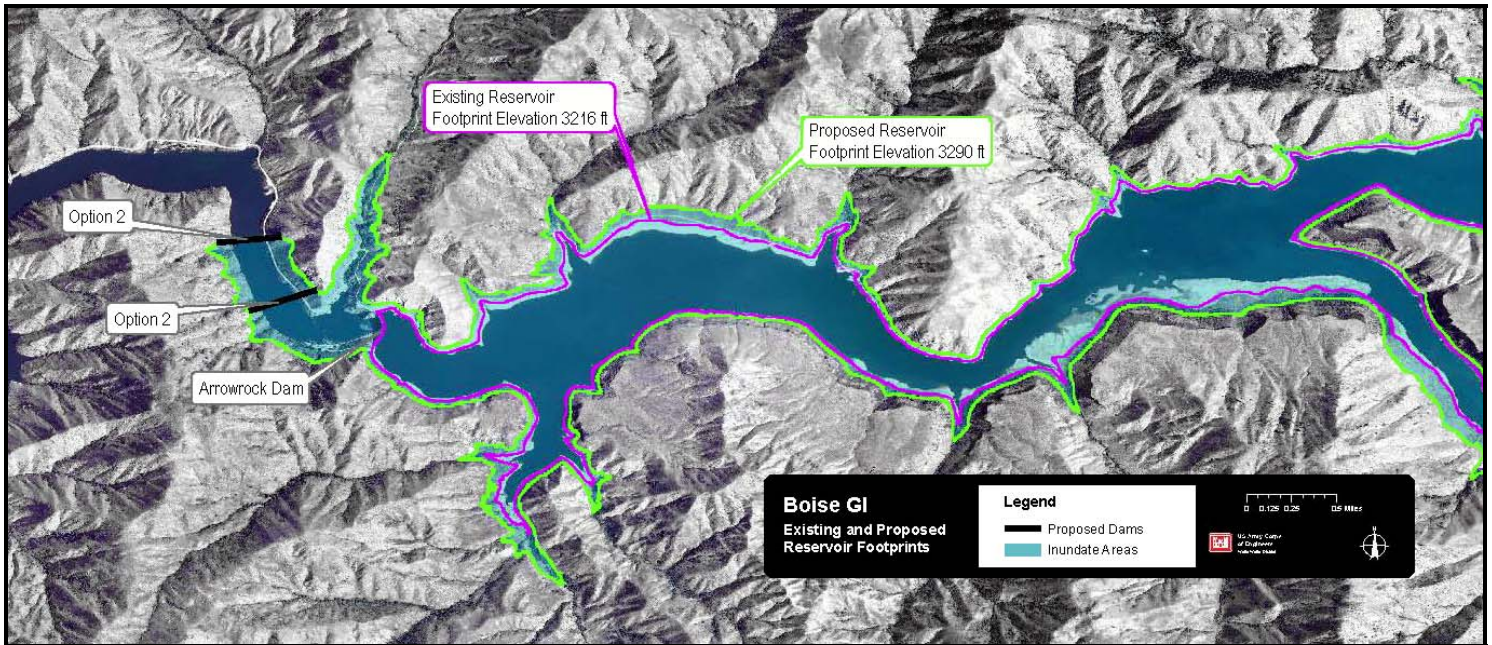
Recommended future analyses to evaluate this site would include, but would not be limited to

- A construction materials survey to determine types, quantity and location of required construction materials;
- Hydrologic and hydraulic analyses to determine how a larger reservoir would be operationally integrated and coordinated with the other Boise River basin storage facilities;
- Environmental surveys and analyses to determine presence and effects to fish, wildlife, plants and cultural resources; and
- Geologic field investigation.

The *Preliminary Analysis of the Arrowrock Site* provides more information about the preliminary analysis. The report can be downloaded from the study website.

NEXT STUDY STEPS: As funding becomes available, the following tasks to complete the interim feasibility study phase would occur:

- Engineering design and costs estimates would be developed, and hydrologic and hydraulic analyses completed for up to three surface water storage sites,
- An economic analysis of infrastructure and land use values in the floodplain to assess flood damages prevented;
- An inventory of current resource conditions would be completed,
- A 'future without project' description would be developed to forecast conditions if no project were pursued,
- An interim feasibility report will be prepared, documenting the information and analyses developed during the interim feasibility phase and the analyses that would be conducted to complete the feasibility study in a later phase, and
- A public meeting to present draft interim feasibility report recommendations and obtain public comment before finalizing the report.



Plan view showing conceptual reservoir footprints for expanded Arrowrock Reservoir capacity through a dam raise or a new dam constructed downstream (Options 1 or 2). The green line shows the increased reservoir boundary. Approximately 6.5 miles of additional river would be inundated with a dam raise.

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